REMARKS

Claims 1 and 3-15 are pending and under consideration. Claims 1, 4-8, and 11-13 have been amended. Claim 2 has been cancelled. New claims 14 and 15 have been added. No new matter has been added.

Claims 5-8 have been amended to replace the original phrase "step (c)" with "reducing the cube elements" that correctly points out to the third operation of claim 1. The labels (a)-(c) of the operations recited in claim 1 were previously removed, which made necessary the present language amendment. Claims 5-8 were also amended to enhance the form without changing the scope. No new matter has been added.

In the Office Action, claims 1-13 were rejected under 35 U.S.C. § 103(a) as unpatentable over a combination of U.S. Patents Nos. 5,398,307 to Arakawa (hereinafter "Arakawa") and 6,366,283 to Tampieri (hereinafter "Tampieri"). In light of the following arguments and the amendments of the claims herewith, Applicant traverses the rejection and respectfully requests reconsideration of the claims.

INTERVIEW WITH THE EXAMINER

First, Applicant wishes to thank the Examiner for the courtesy of an interview granted to Applicant's representative on April 24, 2006, at which time the outstanding issues in this case were discussed. During the interview, Applicant's representative presented the following arguments regarding prior art teachings. The Examiner expressed concern about the vagueness of the "predetermined condition" recited in claim 1. The Examiner indicated that he understood Applicant's arguments, and he would reconsider the outstanding grounds for rejection upon the formal submission of a response including amended claims.

TAMPIERI REFERENCE DOES NOT TEACH "COMBINGING OF THE MESH ELEMENTS"

Arakawa and Tampieri do not teach or suggest all the elements of the claims. More specifically, Tampieri's FIG. 6 and, col. 7, lines 19-29 and line 66 (portions of Tampieri indicated in the "Response to Arguments" section of the Office Action) do not teach or suggest "**combining of the mesh elements**" as recited in claim 1.

In Col. 7, lines 21-22 of Tampieri, "the walls have been **divided** into a large number of small elements, such as element 608" teaches the opposite of **combining** the mesh elements

as recited in the respective claims.

Col. 7, line 66 of Tampieri reciting "with clustering reduces the number of element relationships" refers to reducing the number of **element relationships** (from n squared to n log n) **not** to reducing **the number n of mesh elements** by combining the mesh elements (see, further, Col. 7 line 65, to Col. 8, line 1).

The interpretation of FIG. 6 in the Office Action Page 3, lines 5-10, does not correspond to the description of Fig. 6 in Tampieri's specification. Tampieri describes the upper drawing of FIG. 6 as representing a coarse mesh 601 with elements 602 and 603 and the middle drawing of FIG. 6 as representing a fine mesh 604 with elements 605-606. Tampieri further describes the lower drawing of FIG. 6 as a mesh 607 including both larger mesh elements such as 609 and smaller elements such as 608. The meshes of elements 601 and 604 are described as conventional settings for performing the radiosity simulation outlined in FIGS. 5A through 5D. Relative to obtaining solutions to 5D equations Tampieri states "a radiosity simulation utilising this approach is **impractical** for realistic image synthesis of scenes containing large numbers of elements" (emphasis added).[1] Here, Tampieri recognizes a limitation of his approach.

Referring to the mesh of elements 601 as setting to solve the equation FIG. 5D, Tampieri states[2]:

> "A solution in which a relatively low number of elements are present is illustrated at 601 in FIG. 6. [...] The total number of elements present is relatively small, thereby reducing computational time when evaluating the equation in FIG. 5D, but this in turn **results in a coarse image having visible artefacts.** [...] Thus, by rendering the scene at the level of resolution shown at 601, the shading close to the intersection of the walls will be **unrealistic**" (emphasis added).

Referring to the mesh of elements 604 as setting to solve the equation FIG. 5D, Tampieri states[3]:

> "A solution to this problem is shown at 604. In this example, the walls are the same as those identified at 601 but each wall has been divided into substantially more mesh elements. [...] This results in a significant improvement of the overall realism of the image but **a major increase in terms of computational overhead**. [...] Furthermore, it may be understood that **while the level of meshing has been increased where this is important,** close to the intersection of the walls, **it has also been increased unnecessarily in other areas**" (emphasis added).

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[1] See Tampieri Col. 6, lines 52-55.
[2] See Tampieri Col. 6, line 56, through Col. 7, line 3.
[3] See Tampieri Col. 7, lines 4-18.

That is, the meshes of elements 601 and 604 are described as being "unrealistic" or impractical solutions.

Finally, Tampieri describes the mesh of elements 607 as a setting to solve the equation FIG. 5D[4]:

> "Computational time may be reduced while maintaining image quality by taking a hierarchical approach as illustrated at 607. In this example, **the walls have been divided into a large number of small elements, such as element 608**, at positions where the interaction between the walls is greatest. Similarly, at a distance displaced from the intersection, **the elements, such as element 609, are significantly larger**. In this way, good image quality is obtained while computational overhead is reduced. This type of meshing is further enhanced by only evaluating form factors between mesh elements at an appropriate level of resolution. For example, a large mesh element at the edge of a wall need not evaluate multiple form factors for interactions between all the small mesh elements on the wall opposite that are close to the intersection. Instead, an appropriate coarse superset of the smallest mesh elements is selected for this interaction. Thus it becomes possible to consider the mesh as a nested hierarchy, such that, whenever possible, coarser mesh elements are used to define light exchanges. **The subdivisions of coarse mesh elements are used when the predicted accuracy of light interchange is not sufficiently high.** This technique is known as hierarchical radiosity. A data structure representing the nested levels of mesh elements is known as a multi-resolution representation of the radiosity equation" (emphasis added).

That is, while there is no reference to a transformation from the mesh of elements 604 to the mesh of elements 607, the elements 609 are described as being merely larger than the elements 608. A reference is made to diving the coarse mesh elements, but there is no hint of combining smaller mesh elements.

Tampieri does not teach or suggest any transition from one mesh of elements from FIG. 6 to another mesh of elements therein. The meshes of elements described by Tamplieri are mere settings for solving the equation of FIG. 5D. In contrast, according to claim 1 the cube elements formed by dividing the target object by the grid lines are combined to obtain a smaller number of cube elements.

Thus, Tampieri does not teach or suggest "reducing the cube elements in number by combining the cube elements in accordance with a predetermined condition", as recited in independent claim 1 of the present application. Following the discussions with the Examiner during the interview, Applicant has amended claim 1 by including the limitation of claim 2 in claim 1 and clarifying that the second condition (former predetermined condition) is one of a group of

conditions. The amendments to claim 1 are fully supported by the originally filed specification and claims. Claim 2 has been cancelled, and claim 3 that originally depended on claim 2 now depends on claim 1.

LACK OF TEACHINS, SUGGESTION, OR MOTIVATION TO COMBINE THE PRIOR ART REFERENCES – MPEP 2144-2144.08

Arakawa and Tampieri are disparate teachings raising the question of why a person skilled in the art would even consider these references for a combination, which question the PTO must answer. (See, *In re Lee*, 61 USPQ2d 1430, 1434, Fed. Cir. 2002, requiring the PTO to "explain the reasons one of ordinary skill in the art would have been motivated to select the references ....").

Also, MPEP 2143.01 states that "[o]bviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art."

Moreover, MPEP 2144.08 III states that "[e]xplicit findings on motivation or suggestion to select the claimed invention should also be articulated in order to support a 35 U.S.C. 103 ground of rejection. ... Conclusory statements of similarity or motivation, without any articulated rational or evidentiary support, do not constitute sufficient factual findings." Thus, even if the combination included the elements of the claimed invention, in absence of the motivation to combine it would not have been obvious. Page 4 of the Office Action, merely states that "... it would have been obvious to combine ... Arakawa with ... Tampieri ... . Motivation for this combination is the improved accuracy ... ." The paragraph amounts to conclusory statements and hindsight, without citing any findings in the record of motivation to combine Arakawa and Tampieri.

REJECTION UNDER 35 U.S.C. § 101:

Applicants have amended claim 11 using the language suggested in the Office Action to overcome this rejection. In view of the amendment, the rejection is rendered moot and withdrawal of the same is respectfully requested.

NEW CLAIMS 14 AND 15

New claim 14 is an alternative recitation of the method of claim 1 and is patentable by

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[4] See Tampieri, Col. 7, lines 19-42.

reciting "combining the plurality of first elements according to a predetermined condition to generate a plurality of second elements, each second element corresponding to second data, wherein a number of the second elements is smaller than a number of the first elements."

New claim 15 is directed to a method of thermal fluid analysis of a target object by generating mesh data, as illustrated in FIG. 1 of the application, and is patentable at least because it recites "reducing the cube elements in number by combining the cube elements in accordance with a predetermined condition", which feature is not taught or suggested by the prior art references.

Claims 14 "combining the plurality of first elements according to a predetermined condition to generate a plurality of second elements, each second element corresponding to second data, wherein a number of the second elements is smaller than a number of the first elements"--which features render claims 14 clearly patentable over the references and rejections of record.

Claim 15 recites a method similar with the method of claim 1 which method is used for thermal fluid analysis of a target object and patentably distinguishes over the applied prior art for same reasons as claim 1.

CONCLUSION

Claim 1 patentably distinguishes over the cited prior art at least by reciting:

> "reducing the cube elements in number by combining the cube elements in accordance with a second condition selected from a group of second conditions consisting of preventing a change of a shape of the target object formed of the cube data, preserving a substantial shape of the target object formed of the cube data, preventing a substantial change of a total volume of the combined cube elements, preserving the total volume of the combined cube elements, and maintaining an aspect ratio of surfaces of each of composite cube elements created by combining the cube elements within a predetermined range."

Claims 2-10 depending on claim 1 are also patentable at least by inheriting patentable features from claims 1.

Claims 11-13 are patentable by reciting the same feature as the above cited claim 1.

In view of the presented arguments, Applicants submit that the pending claims patentably distinguish over the prior art. Reconsideration of the claims is respectfully requested.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,
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